DOE/EA-1211

ENVIRONMENTAL ASSESSMENT
FOR THE
RELOCATION AND STORAGE OF
ISOTOPIC HEAT SOURCES
HANFORD SITE
RICHLAND, WASHINGTON

JUNE 1997

U.S. DEPARTMENT OF ENERGY

RICHLAND, WASHINGTON

PREFACE

This environmental assessment (EA) has been prepared to assess potential environmental impacts associated with the U.S. Department of Energy proposed action:

Relocation and storage of the isotopic heat sources.

Environmental impact information contained herein will be used by the U.S. Department of Energy, Richland Operations Office Manager, to determine if the proposed action is a major federal action significantly affecting the quality of the human environment. If the proposed action is determined to be major and significant, an environmental impact statement will be prepared. If the proposed action is determined not to be major and significant, a Finding of No Significant Impact (FONSI) will be issued and the action can proceed. Criteria used to evaluate significance can be found in Title 40, Code of Federal Regulations (CFR) 1508.27.

This EA was prepared in compliance with the *National Environmental Policy Act (NEPA) of 1969*, as amended, the Council on Environmental Quality (CEQ) Regulations for Implementing the Procedural Provisions of NEPA (40 CFR 1500-1508), and the U.S. Department of Energy Implementing Procedures for NEPA (10 CFR 1021). The following describes each section of the EA:

1.0 Purpose and Need for Action. This provides a brief statement concerning the problem or opportunity the U.S. Department of Energy is addressing with the proposed action. As necessary, background information is provided.

2.0 Description of the Proposed Action. A description with sufficient detail to identify potential environmental impacts is provided.

3.0 Alternatives to the Proposed Action. Reasonable alternative actions, which would address the Purpose and Need, are described. A no action alternative, as required by 10 CFR 1021, also is described.

4.0 Affected Environment. This provides a brief description of the locale in which the proposed action takes place, and which may be environmentally impacted.

5.0 Environmental Impacts. The range of environmental impacts, beneficial and adverse, are described for the proposed action. Impacts of alternatives briefly are discussed.

6.0 Permits and Regulatory Requirements. A brief description of permits and regulatory requirements for the proposed action is provided.

7.0 Organizations Consulted. Any outside agencies, groups, or individuals contacted as part of the EA documentation preparation are listed.

8.0 References. Documents used to provide information or data are listed.

Appendices. Additional information necessary to support an understanding of the proposed action, alternatives, and potential impacts is provided. Comments resulting from review of the EA by states and tribes or other stakeholders and the response to those comments are included in the appendices.

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METRIC CONVERSION CHART

Into metric units			Out of metric units		
If you know	Multiply by	To get	If you know	Multiply by	To get
Length			**Length**		
inches	25.40	millimeters	millimeters	0.0393	inches
inches	2.54	centimeters	centimeters	0.393	inches
feet	0.3048	meters	meters	3.2808	feet
yards	0.914	meters	meters	1.09	yards
miles	1.609	kilometers	kilometers	0.62	miles
Area			**Area**		
square inches	6.4516	square centimeters	square centimeters	0.155	square inches
square feet	0.092	square meters	square meters	10.7639	square feet
square yards	0.836	square meters	square meters	1.20	square yards
square miles	2.59	square kilometers	square kilometers	0.39	square miles
acres	0.404	hectares	hectares	2.471	acres
Mass (weight)			**Mass (weight)**		
ounces	28.35	grams	grams	0.0352	ounces
pounds	0.453	kilograms	kilograms	2.2046	pounds
short ton	0.907	metric ton	metric ton	1.10	short ton
Volume			**Volume**		
fluid ounces	29.57	milliliters	milliliters	0.03	fluid ounces
quarts	0.95	liters	liters	1.057	quarts
gallons	3.79	liters	liters	0.26	gallons
cubic feet	0.0283	cubic meters	cubic meters	35.3147	cubic feet
cubic yards	0.7645	cubic meters	cubic meters	1.308	cubic yards
Temperature			**Temperature**		
Fahrenheit	subtract 32 then multiply by 5/9ths	Celsius	Celsius	multiply by 9/5ths, then add 32	Fahrenheit
Radiation			**Radiation**		
Rems	0.01	Sieverts	Sieverts	100	Rems

Source: After *Engineering Unit Conversions*, M. R. Lindeburg, PE., Second Ed., 1990, Professional Publications, Inc., Belmont, California.

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1.0 PURPOSE AND NEED FOR ACTION

The following sections describe the purpose and need and provide background information concerning this environmental assessment (EA).

1.1 PURPOSE AND NEED. The underlying purpose and need for the agency to take the proposed action.

The U.S. Department of Energy (DOE) needs to provide improved storage for the isotopic heat sources.

1.2 BACKGROUND. Background information on the purpose and need, that led to the need for action.

Isotopic Heat Sources

As part of a bilateral agreement between the Federal Minister for Research and Technology of the Federal Republic of Germany (FRG) and the DOE, Pacific Northwest National Laboratory (PNNL) developed processes for the treatment and immobilization of high-level radioactive waste. One element of this bilateral agreement was the production of sealed isotopic heat sources. During the mid-1980s, 30 sealed isotopic heat sources were manufactured during three production runs in the 300 Area, 324 Building B-Cell (PNL 1989). Two production demonstration canisters and 2 instrumented canisters also were produced. The 34 stainless steel canisters were filled with radioactive borosilicate glass. The sources contain a total of approximately 8.3 million curies consisting predominately of cesium-137 and strontium-90 with trace amounts of transuranic contamination.

Currently, the sources are stored in A-Cell of the 324 Building. Intense radiation fields from the sources are causing the cell windows and equipment to deteriorate. Originally, it was not intended to store the isotopic heat sources for this length of time in A-cell.

The 34 isotopic heat sources are classified as remote handled transuranic waste. Transuranic waste is defined as waste contaminated with radionuclides from elements whose atomic numbers exceed 92 (that of uranium) with concentrations greater than 100 nanocuries per gram (0.0000001 curies per gram) of waste. Remote-handled wastes are those with radiation levels exceeding 200 millirem per hour at the surface of a container. Such materials must be handled remotely and require special shielding in treatment, storage, and disposal facilities. The borosilicate glass waste form in the isotopic heat sources does not meet the definition of a dangerous (hazardous) waste as defined by Washington Administrative Code (WAC) Chapter 173-303, *Dangerous Waste Regulations*.

Thirty-one of the isotopic heat sources are sealed, and seals on the three remaining isotopic heat sources have not been verified. However, a decision has been made to place the remaining three isotopic heat sources into the CASTOR cask(s). The Washington State Department of Health (WDOH) has concurred that isotopic heat sources with verified seals or those placed into CASTOR cask(s) can be considered sealed (no potential to emit radioactive air emissions) and are exempt from WAC Chapter 246-247, *Radiation Protection - Air Emissions*.

2.0 DESCRIPTION OF THE PROPOSED ACTION

Proposed Action description in detail sufficient to identify potential environmental impacts.

The proposed action involves: the construction of a storage site located within the Central Waste Complex (CWC) in the 200 West Area and relocation of the isotopic heat sources from the 324 Building to the storage site, including handling, transportation, and storage. The CWC is committed to waste management activities by treating and storing mixed and/or radioactive waste. The storage site would allow monitoring, surveillance, maintenance, and retrieval capability until a national repository is established for this waste type. At that time, the waste would be relocated to a national repository.

The proposed action would include the construction of a reinforced concrete storage pad near the intersection of 16th Avenue and Dayton Street, adjoining the existing Alkali Metals Storage Pad. The storage pad would have the approximate dimensions of 9.1 meters (30 feet) by 32 meters (105 feet) with a metal roof over the storage pad for weather protection. The proposed action would include fencing around the storage pad, jersey bounce dividers, and a fire break that would surround the storage pad. The dimension of the fire break would be 30 meters (100 feet) from the edge of the storage pad. The fire break would take advantage of the following; an existing gravel road to the south, and an existing cleared area reserved for future expansion of the Alkali Metals Storage Pad to the north. To the east, the storage pad would be sited as close as practical to the existing gravel road but would still need to maintain vehicle access to the storage pad (Figure 1). Fill and gravel may be placed as necessary to prevent soil erosion.

Two types of previously constructed transportation/storage casks (hereinafter referred to as "casks") will be used in the proposed action and have been provided by the German Government. The casks would provide containment of the payload. Assurance of competent performance of the cask designs has been established both by analysis and by testing. Assurance of the CASTOR cask performance is documented in: "Safety Analysis Report for Packaging (Onsite) CASTOR GSF Cask" (RFSH 1997b). Assurance of the GNS cask performance is documented in: "Safety Analysis Report for Packaging (Onsite) for the GNS-12 Packaging" (RFSH 1997a). The casks are leak checked after loading to demonstrate the cask is leak tight. The isotopic heat sources are not gas generating, and as designed, the casks do not vent to the surrounding atmosphere once the cask lids are installed and sealed.

Loading of the isotopic heat sources into these casks using remotely operated cranes would occur in the 324 Building radiochemical engineering cells (REC). The REC are a shielded facility equipped for remote handling of highly radioactive materials. Entry into the shielded hot cells is through a shielded airlock (Figure 2). Before loading the casks, the cell operating equipment would be functionally tested and repaired as necessary.

Transportation of the loaded casks would use both rail and truck or truck only. Up to eight shipments would be required to relocate the isotopic heat sources from the 300 Area to the 200 West Area. One additional transport would be needed to relocate an International Standards Organization (ISO) container containing two empty GNS-12 casks, from the Hanford Site 1100 Area, where it is currently stored.

Transportation by rail would occur from the 324 Building to the 200 West Area laydown pad. The laydown pad would be approximately 0.8 kilometer (½ mile) from the storage site at CWC. The casks would be loaded on a rail car at the 324 Building. All casks would be transported over a railroad system within the Hanford Site boundary. During transportation, the railroad system crosses roadways accessible to the general public or site employees at two locations. To preclude potential radiation exposure to the general public or site employees during transportation, the railroad crossings would be closed by Hanford Patrol when a train approached

the crossing. Upon reaching the laydown pad, the casks would be off-loaded by a portable crane onto a truck and transported 0.8 kilometer (½ mile) to the storage site. On reaching the storage site, a portable crane would off-load the cask onto the storage site. Total transportation time for a single cask is expected to take approximately 3.5 hours.

Transportation by truck only would occur directly from the 324 Building to the storage site. The casks would be loaded on a truck in the 324 Building. All casks would be transported over roadways located within the Hanford Site boundary. To preclude potential radiation exposure to the general public or site employees during transportation, the roadways would be restricted by Hanford Patrol. On reaching the storage site, a portable crane would off-load the cask onto the storage site. Total transportation time for a single cask is expected to take approximately 2.0 hours.

During transport (by both railcar and truck), the shielding of the casks would limit the contact dose rate to less than 0.0007 Sieverts per hour (70 millirem per hour). The dose rate at 2 meters (6.6 feet) from the cask surface would be limited to less than 0.0001 Sieverts per hour (10 millirem per hour).

During storage, the storage site would support eight casks containing the isotopic heat sources and two ISO containers and the ancillary equipment (e.g., impact limiters, handling equipment) associated with the casks. The casks would be separated by a minimum of 0.9 meter (3 feet) to allow routine inspections. Additionally, none of casks would be placed within 1.5 meters (5 feet) of the edge of the storage pad. Storage of the casks, the ISO containers, and ancillary equipment would use a majority of the storage pad (Figure 3). (The dimensions of casks are shown in Table 1.) During storage, the casks routinely would be monitored by CWC personnel and soil areas would be kept clear of vegetation for fire control by herbicide application.

2.1 PROPOSED TIMING. Timing or schedule of the proposed action (including phasing, if applicable).

The proposed action would be accomplished on the following schedule.

- Construction of storage site is scheduled to begin in spring or summer of 1997. Construction of the storage pad is expected to take approximately 2 months. Following cask placement, final construction of storage site would be completed.

- The first transfer of loaded casks is scheduled to begin in summer of 1997. Loading and transport of the casks is expected to take less than 2 months.

2.2 ENVIRONMENTAL INFORMATION. Other environmental information that has been prepared, or will be prepared, directly related to the proposed action.

Biological Reviews (Appendix A) and a Cultural Resources Review (CRR) (Appendix B) have been prepared for the proposed action. The CRR concluded: "Several isolated prehistoric and historic artifacts have been recorded within one mile of the project area, however, no cultural resources were identified in the project area or near vicinity."

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3.0 ALTERNATIVES TO THE PROPOSED ACTION

Alternatives to the proposed action are discussed in the following sections.

3.1 NO ACTION ALTERNATIVE CEQ and the DOE NEPA regulations require the DOE to analyze the "No Action alternative," i.e., to examine what would happen if nothing were done. Note that generally this is a continuation of the status quo.

The No Action alternative would keep the isotopic heat sources in the 324 Building. Continued storage of the isotopic heat sources would require that the 324 Building remain operational indefinitely. This alternative would not resolve the concern regarding deterioration of the equipment and windows in A-Cell. The No Action alternative would not meet the purpose and need.

3.2 USE OTHER STORAGE AREAS Other alternatives considered. CEQ regulations direct all agencies to identify reasonable alternatives that would achieve the purpose and need.

There are other areas considered that would be available or could become available; for example, the 400 Area Interim Storage Area (existing storage area), 200 Area ISA (planned to be constructed), and 200 East Area Canister Storage Building (CSB) (under construction).

The GNS and CASTOR casks would exceed the 2 millirem per hour requirement for storage at the 400 Area ISA. Placement of these loaded casks in the 400 Area ISA would increase exposure to personnel occupying facilities adjacent to the 400 Area ISA and to personnel performing activities including surveillance and maintenance of the casks currently in storage. The 200 Area ISA is not an existing storage pad and is in the planning stages. Construction of the 200 Area ISA is not scheduled to be completed until the end of fiscal year 1999. The CSB is currently under construction and its availability for this purpose would be in the 2002 time frame. Additionally, the 400 Area ISA, 200 Area ISA, and the CSB are outside the CWC boundary.

Alternate storage locations were considered within the 200 West Area CWC that are adjacent to existing rail spurs; however, none of the sites met siting criteria (e.g., free of contaminated soil, adequate space, etc.).

During the comment period, two alternative storage locations were suggested: an area between the experimental barrier cap and the defueled reactor compartment trench just south of the 200 East Area north fence line; and, an area south of 12th Avenue and between Akron and Route 4 just outside the 200 East Area fence line. The experimental barrier cap area is to be used for burial ground activities and therefore is not compatible with above surface storage activities. Both of these sites are outside the CWC boundary.

3.3 ALTERNATIVE MODES OF TRANSPORTATION

Under this alternative, the casks would be transferred entirely by rail. A railroad network exists on the Hanford Site that connects the 300 Area and the 200 West Area. However, no access spur runs from the existing rail line in the 200 West Area to the proposed storage site. This alternative would disturb additional Hanford Site land in the 200 West Area to construct a railroad spur to the site.